

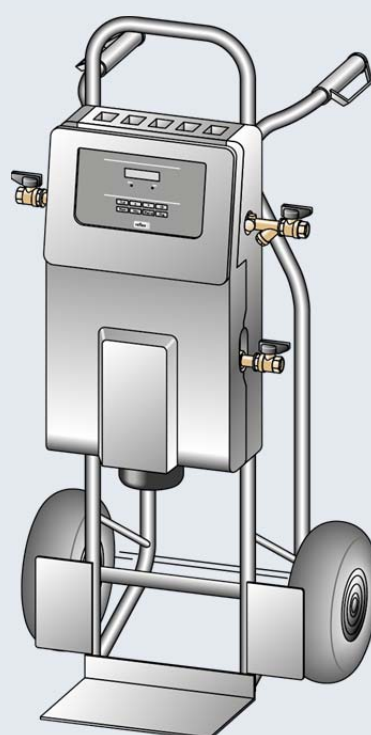
# Vacuum spray degassing

Servitec 30 Mobil

GB

## Operating manual

Original operating manual





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## 1 Notes on the operating manual

This operating manual is an important aid for ensuring the safe and reliable functioning of the device.

The operating manual will help you to:

- avoid any risks to personnel.
- become acquainted with the device.
- achieve optimal functioning.
- identify and rectify faults in good time.
- avoid any faults due to improper operation.
- cut down on repair costs and reduce the number of downtimes.
- improve the reliability and increase the service life of the device.
- avoid causing harm to the environment.

Reflex Winkelmann GmbH accepts no liability for any damage resulting from failure to observe the information in this operating manual. In addition to the requirements set out in this operating manual, national statutory regulations and provisions in the country of installation must also be complied with (concerning accident prevention, environment protection, safe and professional work practices, etc.).

This operating manual describes the device with basic equipment and interfaces for optional equipment with additional functions. For optional equipment and accessories, see chapter 4.6 "Optional equipment and accessories" on page 14 ..



### Notice!

Every person installing this equipment or performing any other work at the equipment is required to carefully read this operating manual prior to commencing work and to comply with its instructions. The manual is to be provided to the device operator and must be stored near the device for access at any time.

## 2 Liability and guarantee

The device has been designed using state-of-the-art technology and in accordance with generally recognised technical safety regulations. Nevertheless, its use can pose a risk to life and limb of personnel or third persons as well as cause damage to the system or other property.

It is not permitted to make any modifications at the device, such as to the hydraulic system or the circuitry.

Warranty and liability claims will not be accepted by the manufacturer if these can be traced back to one or more of the following causes:

- Improper use of the device.
- Improper start-up, operation, maintenance, servicing, repair or installation of the device.
- Failure to observe the safety information in this operating manual.
- Operation of the device with defective or improperly installed safety/protective equipment.
- Failure to perform maintenance and inspection work according to schedule.
- Use of unapproved spare parts and accessories.

Prerequisite for warranty claims is the proper handling of the device.

### 3 Safety

#### 3.1 Explanation of symbols

##### 3.1.1 Symbols and notes used

The following symbols are used in this operating manual.



#### Danger

- Danger to life and/or severe damage to health
  - The corresponding warning symbol in combination with the "Danger" signal term indicates an imminent threatening danger which will result in death or severe (irreversible) injuries.



#### Warning

- Severe damage to health
  - The corresponding warning symbol in combination with the "Warning" signal term indicates a threatening danger which may result in death or severe (irreversible) injuries.



#### Caution

- Damage to health
  - The corresponding warning symbol in combination with the "Caution" signal term indicates a danger which may result in minor (reversible) injuries.



#### Attention!

- Damage to property
  - This symbol in combination with the "Attention" signal word indicates a situation that may cause damage to the product itself or objects in its vicinity.



#### Notice!

This symbol in combination with the "Notice" signal word indicates useful tips and recommendations regarding the efficient use of the product.

##### 3.1.2 Safety symbols used

The following safety symbols are used in this operating manual. They are also attached to the equipment or in its vicinity.



This symbol warns of electric voltage.



This symbol warns of a hot surface.



This symbol warns of overpressure in conduits and connections.

### 3.2 Personnel requirements

Only specialist personnel or specifically trained personnel may install and operate the equipment.

The electric connections and the wiring of the device must be executed by a specialist in accordance with all applicable national and local regulations.

### 3.3 Personal protective equipment

When working at the system, wear the stipulated personal equipment such as hearing and eye protection, safety boots, helmet, protective clothing, protective gloves.



See the national regulation of your country for personal protective equipment required.

### 3.4 Intended use

The device is used in facility systems for stationary heating and cooling circuits. The devices may be used only in systems that are sealed against corrosion and with the following water types:

- Non-corrosive
- Chemically non-aggressive
- Non-toxic

Minimise the entry of atmospheric oxygen due with permeation in the entire facility system and make-up with water.



#### **Note!**

Ensure the quality of the make-up water as specified by national regulations.

- For example, VDI 2035 or SIA 384-1.

### 3.5 Inadmissible operating conditions

The device is not suitable for the following applications:

- Outdoor operation.
- For the use with mineral oils.
- For the use with flammable media.
- For the use with distilled water.



#### **Note!**

It is not permitted to make any modifications to the hydraulic system or the circuitry.

### 3.6 Residual risks

This device has been manufactured to the current state of the art. However, some residual risk cannot be excluded.



#### Caution – risk of burning!

- Excessively hot surfaces in heating systems can cause burns on the skin.
  - Wear protective gloves.
  - Please place appropriate warning signs in the vicinity of the device.



#### Caution – risk of injury!

- If installation, removal or maintenance work is not carried out correctly, there is a risk of burns and other injuries at the connection points, if pressurised hot water or hot steam suddenly escapes.
  - Ensure proper installation, removal or maintenance work.
  - Ensure that the system is de-pressurised before performing installation, removal or maintenance work at the connection points.



#### Caution – risk of injury!

- The contact with glycol-containing water in facility systems for cooling circuits may cause skin and eye irritation.
  - Wear personal protective equipment.



#### Caution – Weight!

- The device weight may cause physical damage or accidents.
  - If necessary, have a second person help you with the assembly or disassembly.



#### Caution – Device damage during transport!

- Improper transporting procedures cause damage to the connections for degassing and make-up lines.
  - Use suitable covers to protect the connections against damage.
  - Transport the device only in vertical position.



#### Caution – Property damage during transport!

- Improper transporting procedures may cause damage to property.
  - Fasten the device with suitable transport securing means such as straps.



## 4 Description of the device

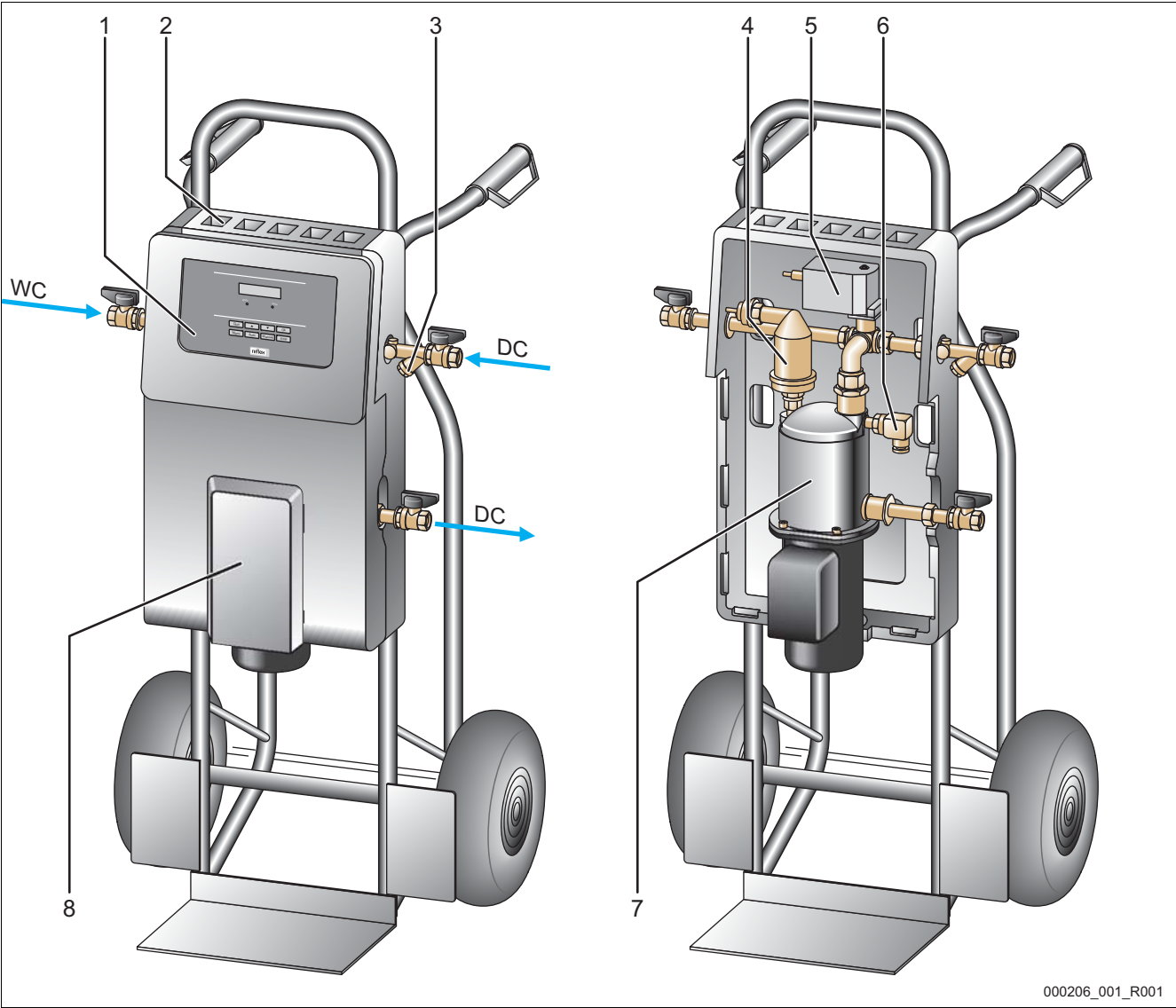
### 4.1 Description

The device is a mobile degassing and make-up station. The principal applications are heating and cooling circuits and new installations of facility systems in which dissolved or free gases must be eliminated. The device uses a 3-ways motor ball valve for the hydraulic control of the facility and make-up degassing and a vacuum for the degassing process itself.

The device provides the following safety features:

- No direct intake of air thanks to a regulation of the pressure maintenance with automatic water make-up.
- No circulation issues caused by free bubbles in the circuit water.
- Reduced corrosion damage due to oxygen removal from fill and make-up water.

4.2 Overview



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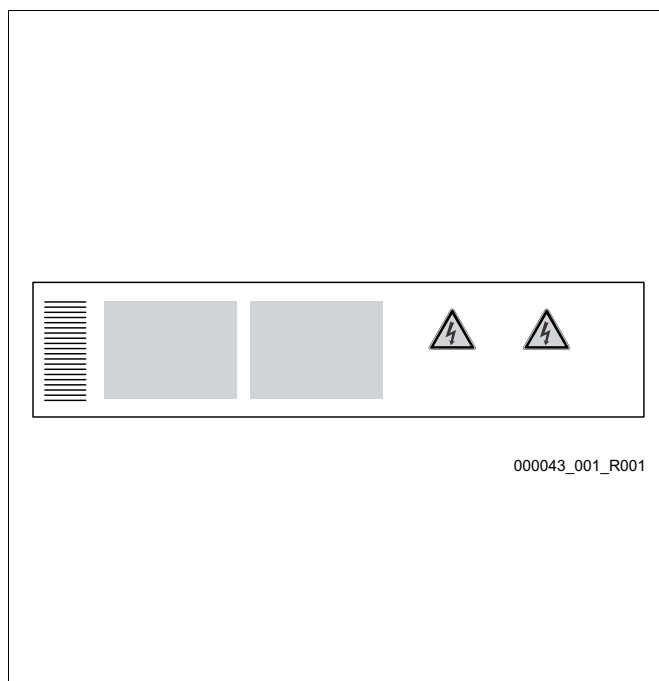
1	Controller
2	Venting grille
3	"ST" dirt trap
4	"DV" degassing valve
5	"CD" 3-ways motor ball valve for the hydraulic regulation of system and make-up degassing

6	"PIS" pressure transducer
7	"PU" vacuum degassing pump
8	Removable front shell
WC	Connection for the make-up with fresh water
DC	Degassing connection <ul style="list-style-type: none"><li>• Gas-rich water inlet.</li><li>• Degassed water outlet.</li></ul>

### 4.3 Identification

The nameplate provides information about the manufacturer, the year of manufacture, the manufacturing number and the technical data.

Information on nameplate	Meaning
Type	Device name
Serial No.	Serial number
min. / max. allowable pressure P	Minimum/maximum permissible pressure
max. continuous operating temperature	Maximum temperature for continuous operation
min. / max. allowable temperature / flow temperature TS	Minimum/maximum permissible temperature/TS flow temperature
Year built	Year of manufacture
min. operating pressure set up on shop floor	Factory-set minimum operating pressure
at site	Set minimum operating pressure
max. pressure safety valve factory - aline	Factory-set opening pressure of the safety valve
at site	Set opening pressure of the safety valve



### 4.4 Function

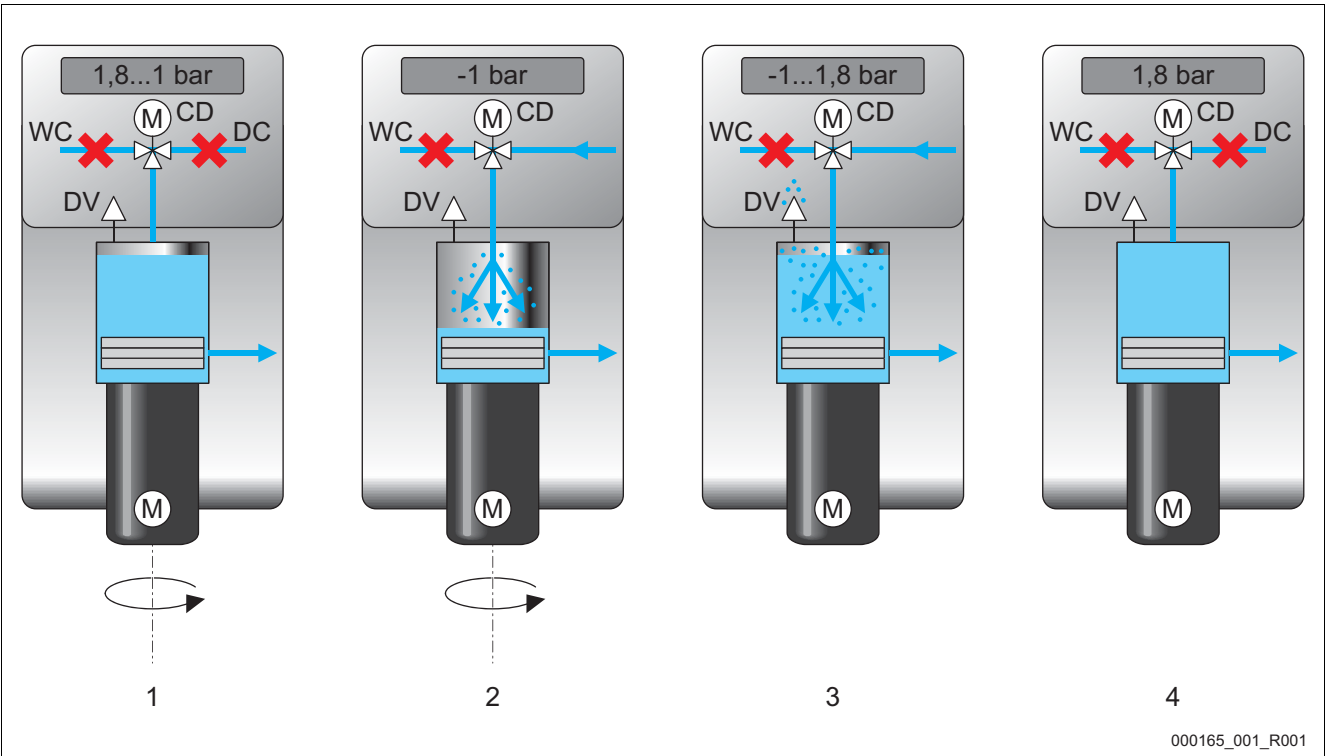
The device degasses the water from the facility system and the fresh water from the make-up line. It removes up to 90 percent of the dissolved gases from the water. The degassing operation uses timer-controlled cycles.

A cycle comprises the following phases:

1. Vacuum is drawn
  - The "PU" pump draws a vacuum. The inlet to the "DC" pump remains closed.
2. Atomisation
  - The inlet to the "PU" vacuum pump is opened. Depending on the actual demand, a partial flow of the gas-rich system water of the facility system or the fresh make-up water are introduced through the "DC" or "WC" lines of the device. The water is then finely atomised in the vacuum pump. The large surface of the atomised water and the large gas saturation headway to the vacuum result in a degassing of the water. The degassed water is returned to the system via the vacuum pump.
3. Discharge
  - The "PU" vacuum pump shuts off. The system continues to atomise and degas water. The water level in the vacuum pump rises. The gases separated from the water are discharged into the ambient atmosphere via the "DV" degassing valve.
4. Idling time
  - When the gas has been discharged, the device will remain in idle until the next cycle is started.

Degassing cycle sequence in the PU vacuum pump

Cooling water system ≤ 30 °C, System pressure 1.8 bar, "DC" system degassing in operation, "WC" make-up degassing closed.



1	Vacuum is drawn
2	Atomisation

3	Discharge
4	Idling time

Degassing

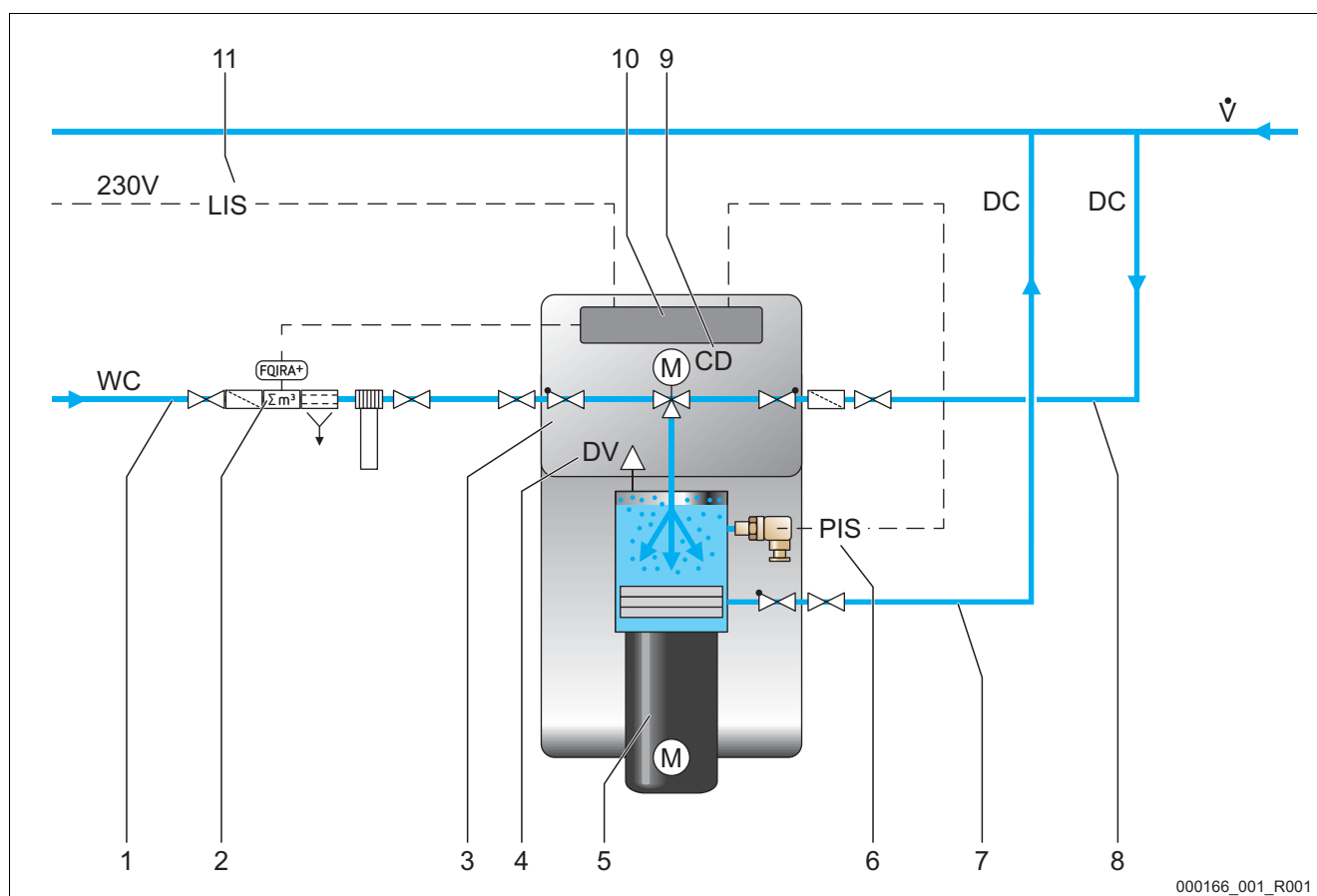
The entire degassing process is hydraulically synchronised by the "CD" 3-ways motor ball valve and the device controller. The system monitors the operating states and displays them at the controller. The controller provides 3 different degassing programmes and 2 different make-up variants for selection and setting.

Degassing programmes

- Continuous degassing: For continued degassing over several hours or days in a sequence of degassing cycles without idling periods. This programme is recommended after commissioning and repairs.
- Interval degassing: Interval degassing comprises a limited number of degassing cycles. The system idles between the intervals. This programme is recommended for continuous operation.
- Make-up degassing: Make-up degassing automatically activated for every water make-up during continuous or interval degassing. The process is the same as in continuous degassing. The degassing time is limited by the make-up time.

## Make-up variants

There are two make-up variants. Both are monitored via the make-up time and the make-up cycles.



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1	"WC" make-up line	7	"DC" degassing line (degassed water to the facility system)
2	Optional add-on device (see Chapter Optional equipment and accessories)	8	"DC" degassing line (gas-rich water from the facility system)
3	Device	9	"CD" 3-ways motor ball valve
4	"DV" degassing valve	10	Device controller
5	"PU" vacuum pump	11	Signal line from the "LIS" level sensor of a pressure maintaining station
6	"PIS" pressure transducer from the device		

### Magcontrol:

For systems with diaphragm-type pressure expansion tank.

- Using the integrated "PIS" pressure sensor, the system registers and monitors the pressure in the heating or cooling system. The make-up degassing process is activated as soon as the pressure drops below the calculated filling pressure.

### Levelcontrol:

For systems with pressure maintaining stations.

- The pressure maintaining station uses the "LIS" pressure pick-up to determine the water level in the expansion tank. The make-up function is triggered by a 230 V signal.



### Note!

Ensure the correct connection of the device to the facility system.

- For the Levelcontrol make-up variant in particular, the signal line from the level sensor of the pressure maintaining station must be connected to the device.

## 4.5 Scope of delivery

The scope of delivery is described in the shipping document for the initial shipment and the content is shown on the packaging.

Immediately after receipt of the goods, please check the shipment for completeness and damage. Please notify us immediately of any transport damage.

Basic degassing equipment:

- Device with transport unit
- 3 ball valves for degassing and make-up connections
- Operating manual

## 4.6 Optional equipment and accessories

The following optional equipment and accessories are available for this device:

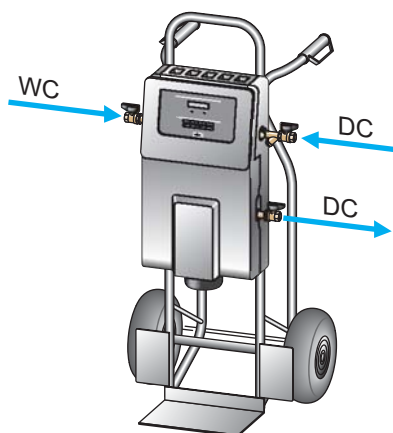
- Fillset for make-up with water.
  - Fillset with integrated backflow preventer, water meter, dirt trap, and locking mechanisms for the "WC" make-up line.
- Fillset Impulse with FQIRA+ contact water meter for make-up with water.
  - If the Fillset Impulse with FQIRA+ contact water meter is installed in the make-up line, you can regulate the entire make-up quantity and the soft water capacity of Fillsoft softening systems. The operational reliability of the device is assured and prevents the automatic make-up during major water loss or small leaks.
- Fillsoft for softening the make-up water from the public water network.
  - Fillsoft is installed between Fillset and the device. The device controller evaluates the make-up quantities and signals a required replacement of the softening cartridges.
- Enhancements for the device controller.
  - Use the RS-485 interface to retrieve various data from the controller and to communicate with control centres or other devices.,see chapter 6.5.2.1 "Connecting the RS-485 interface" on page 28 . You need the following items for the communication of the RS-485 interface with control centres or other devices:
    - Bus modules for the communication with control centres
    - Lonworks Digital
    - Lonworks
    - Profibus-DP
    - Ethernet
    - I/O module for standard communication
- Gas discharge measurement for an optimised degassing operation.



### **Note!**

Separate operating instructions are supplied with accessories.

## 5 Technical data

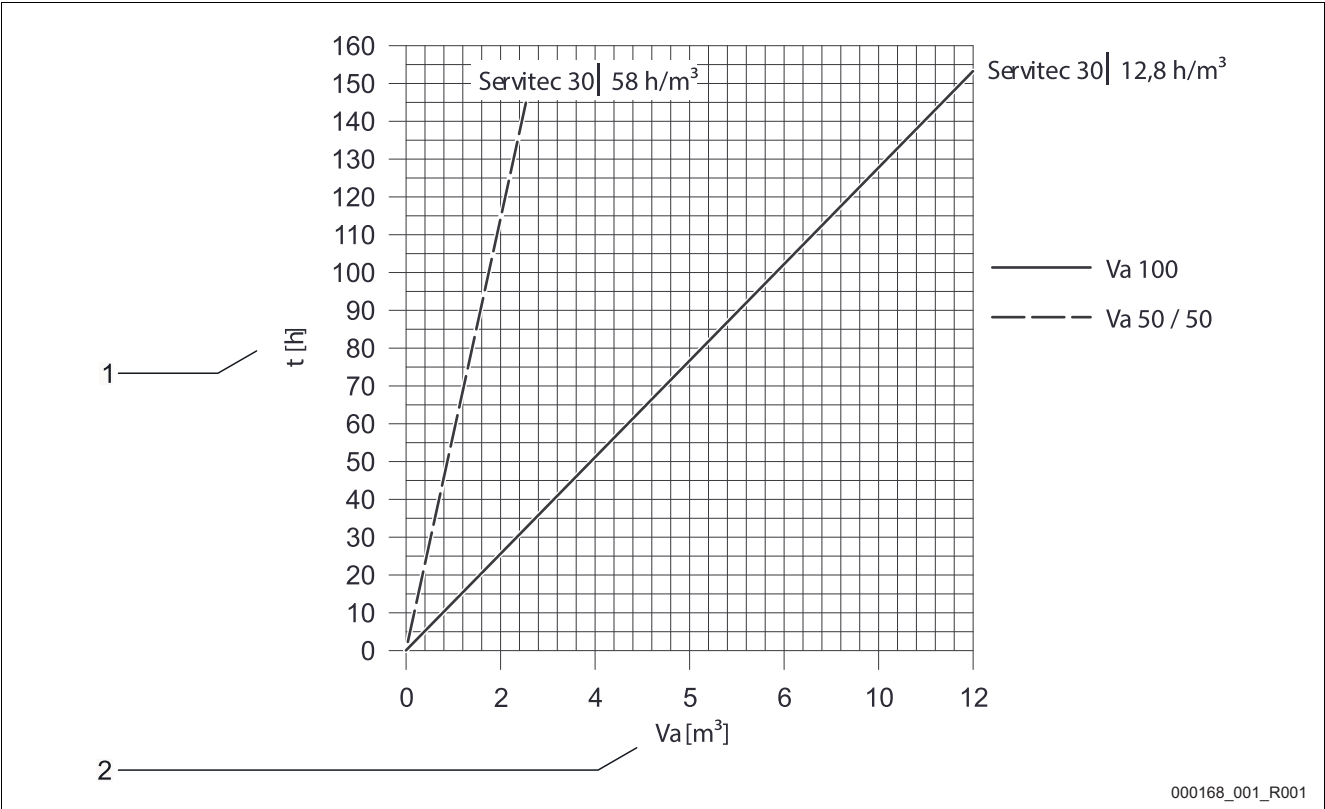


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Type	Servitec 30 Mobil
Part No.	<ul style="list-style-type: none"> <li>• 8828600 (model with "J" mains plug)</li> <li>• 8828650 (model with earthed plug)</li> </ul>
Width	600 mm
Height	1200 mm
Depth	500 mm
Weight	27 kg
Permissible gauge operating pressure	8 bar
Maximum inlet pressure for make-up	6 bar
Permissible operating temperature	<ul style="list-style-type: none"> <li>• System degassing &gt; 0 – 70 °C</li> <li>• Make-up degassing &gt; 0 – 30 °C</li> </ul>
Permissible ambient temperature	> 0 – 45 °C
Degree of discharge	<ul style="list-style-type: none"> <li>• Dissolved gases ≤ 90 %</li> <li>• Free gases 100 %</li> </ul>
Noise level	55 db
Degree of protection IP	54
Electrical power supply	<ul style="list-style-type: none"> <li>• Output 470 W</li> <li>• Fusing 10 A</li> <li>• Voltage 230 V</li> <li>• Frequency 50 Hz</li> </ul>
Electrical power supply, controller	<ul style="list-style-type: none"> <li>• Voltage 230 V</li> <li>• Fusing 4 A</li> </ul>
System volume *	<ul style="list-style-type: none"> <li>• Va 100 12 m<sup>3</sup></li> <li>• Va 50/50 4 m<sup>3</sup></li> </ul>
Working pressure	0.5 – 3.0 bar
Make-up output	0.05 m <sup>3</sup> / h
Connector for "DC" degassing line, internal thread (IG)	<ul style="list-style-type: none"> <li>• To the device IG ½ "</li> <li>• To the facility system IG ½ "</li> </ul>
Connector for "WC" make-up line, internal thread (IG)	IG ½ "

\* Va 100 = 100 % water; Va 50/50 = water with anti-freeze portion to 50%

Approximate values for the maximal "Va" system volume to be degassed under extreme conditions during commissioning at a nitrogen reduction from 18 mg/l to 10 mg/l.



1	Continuous degassing "t" [h]
---	------------------------------

2	System volume "Va" [m³]
---	-------------------------



## 6 Installation



### Danger – electric shock!

- Risk of serious injury or death due to electric shock.
  - Ensure that the system is voltage-free before installing the device.
  - Ensure that the system is secured and cannot be reactivated by other persons.
  - Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.



### Caution – risk of injury!

- If installation, removal or maintenance work is not carried out correctly, there is a risk of burns and other injuries at the connection points, if pressurised hot water or hot steam suddenly escapes.
  - Ensure proper installation, removal or maintenance work.
  - Ensure that the system is de-pressurised before performing installation, removal or maintenance work at the connection points.



### Caution – risk of burning!

- Excessively hot surfaces in heating systems can cause burns on the skin.
  - Wear protective gloves.
  - Please place appropriate warning signs in the vicinity of the device.



### Caution – Risk of injury due to falls or bumps!

- Bruising from falls or bumps at system components during installation.
  - Wear personal protective equipment (helmet, protective clothing, gloves, safety boots).

## 6.1 Installation conditions

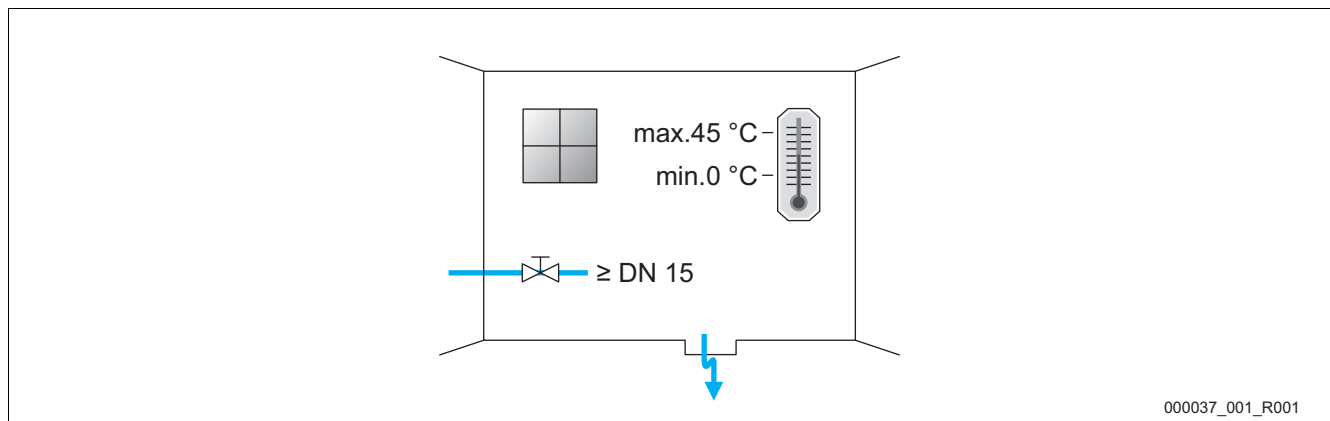
### 6.1.1 Incoming inspection

Prior to shipping, this device was carefully inspected and packed. Damages during transport cannot be excluded.

Proceed as follows:

1. Upon receipt of the goods, check the shipment for
  - completeness and
  - possible transport damage.
2. Document any damage.
3. Contact the forwarding agent to register a complaint accordingly.

## 6.2 Preparatory work



### Preparing the connection of the device to the facility system:

- Barrier-free access to the facility system.
- Level and solid placement surface for the device.
- Frost-free, well-ventilated room.
  - Room temperature > 0 - 45 °C.
- Drain for drain water.
- Filling connection.
  - DN 15 according to DIN 1988 T 4.
- Electric connection.
  - 230 V~, 50 Hz, 16 A with upstream ELCB (tripping current: 0.03 A).

### 6.3 Execution



#### Caution – risk of injury!

- Bodily harm from a toppling device.
  - Ensure sufficient stability of the device.
  - Weigh down the bearing surface of the device's transport unit with suitable means.



#### Caution – damage from improper connection!

- Bear in mind that the device may be subject to additional stresses through the connection of piping or hose connections to the facility system.
  - Ensure that all connections to the facility system are free from stresses.
  - If necessary, provide support structures for the pipes.



#### Caution – Property damage caused by leaks!

- Leaks in the connection lines to the device can cause damage to the facility system.
  - Use only connection lines with appropriate resistance against the facility system temperature.



#### Note!

The screw connections at the device may loosen when the device is moved to another location.

- Prior to using the device check the screw connections for proper seating and sealing.



#### Note!

Avoid leaks at the connections.

- When connecting the device to the facility system, ensure that the connections for degassing and make-up are not twisted.

Proceed as follows:

- Connect the device at the return flow side of the facility system.
  - In this manner, you ensure that the device is operated within the permissible pressure and temperature ranges.
- In the case of a facility system with return flow admixture or a hydraulic switching point, connect the device upstream of the switching point.
  - In this manner, you ensure the water degassing in the "V" main volume flow at temperatures  $\leq 70^\circ\text{C}$ .

The device is pre-wired and must be adapted for the local system conditions.

Proceed as follows:

1. Complete the water side connections from the device to the facility system.
2. Complete the electric connection as shown in the terminal plan, see chapter 6.5 "Electrical connection" on page 25 .



#### Note!

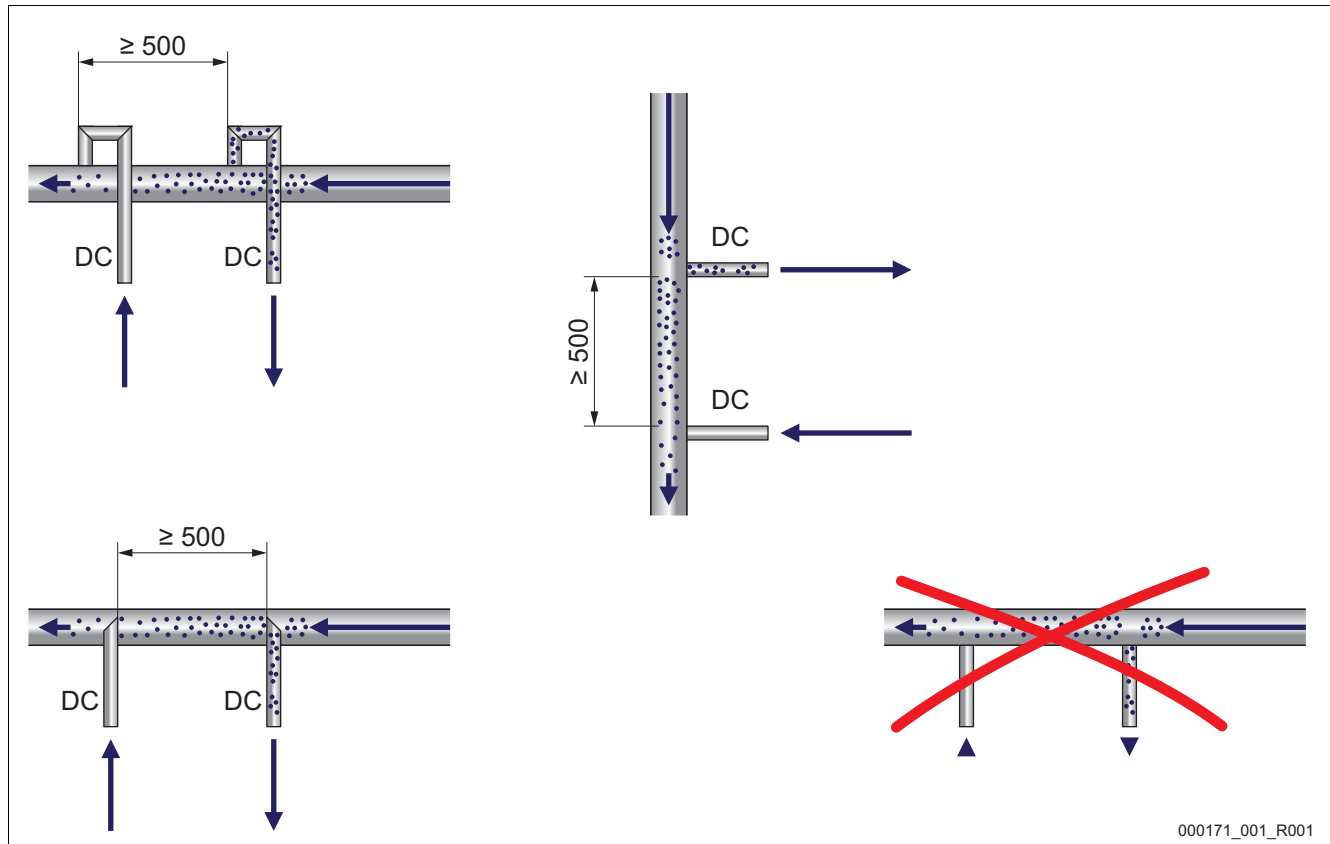
During connection, ensure the operability of the valves and the inlet options for the connecting lines.

### 6.3.1 Hydraulic connection

#### 6.3.1.1 Degassing line to the system

##### Installation detail of the "DC" degassing line

Install the "DC" degassing lines as shown below:

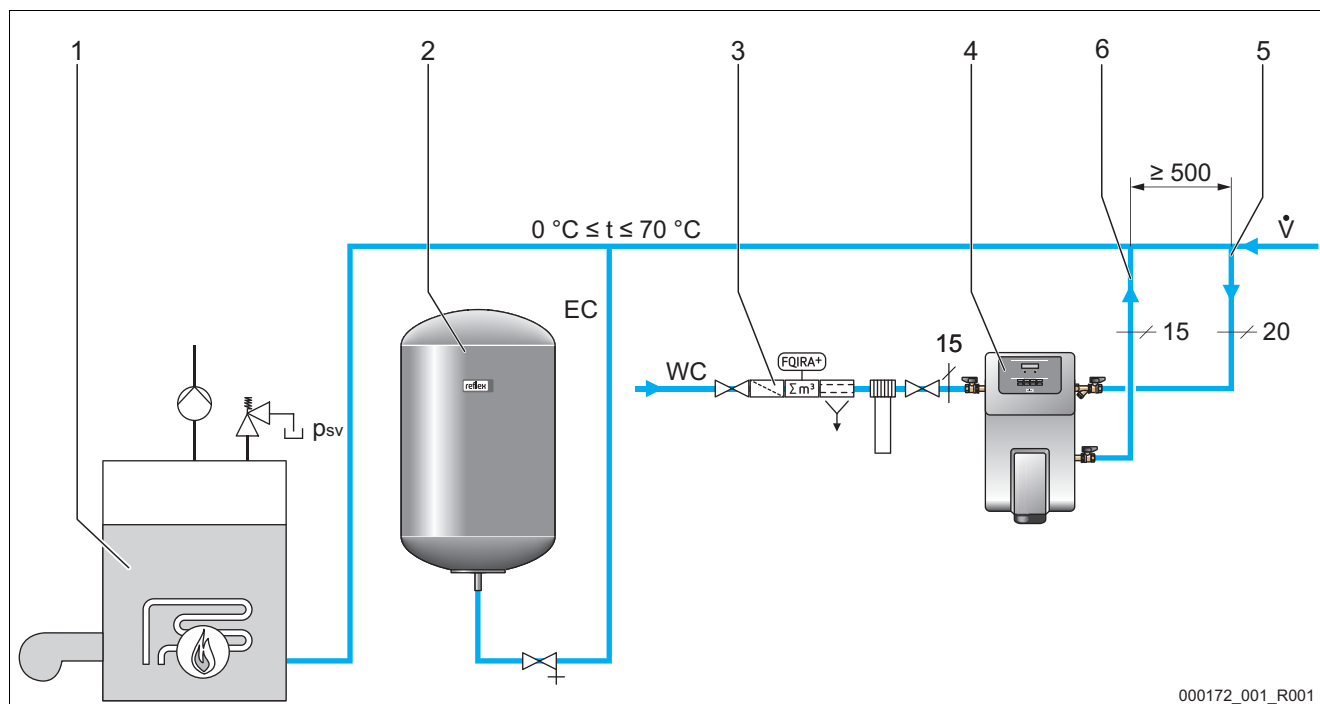


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Proceed as follows:

- Prevent an overload of the "ST" dirt trap in the device caused by coarse dirt.
- Install the "DC" gas-rich degassing line upstream of the gas-poor degassing line when viewed in system flow direction.
- Preferably install at the return flow side of the facility system.
  - The water temperature must be in the range of 0 °C to 70 °C to ensure sufficient degassing capacity.

# Device installation in a heating system – Pressure maintenance with diaphragm-type "MAG" expansion tank



1	Heating system
2	Pressure expansion tank
3	For optional equipment and accessories, see chapter 4.6 "Optional equipment and accessories" on page 14

4	Device
5	"DC" degassing line (gas-rich water)
6	"DC" degassing line (degassed water)

Proceed as follows:

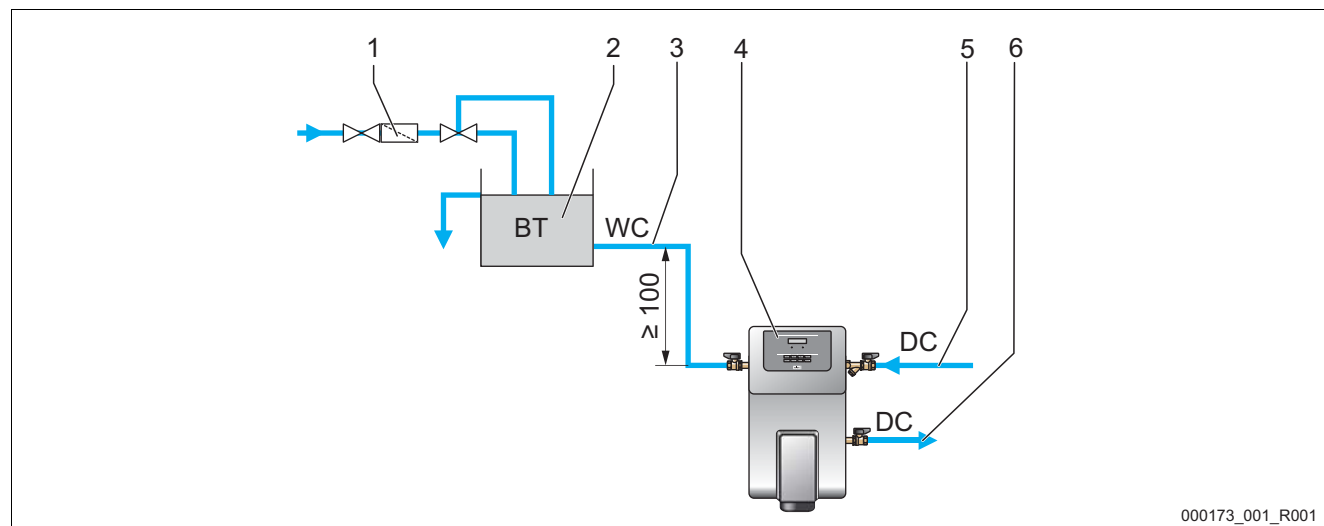
- Connect the "DC" degassing lines in the "V" main volume flow of the facility system.
- The device requires two "DC" degassing lines to the facility system.
  - One degassing line for the gas-rich water from the facility system
  - One degassing line for the degassed water back to the facility system
- Install the degassing lines near the "EC" expansion line.
  - You ensure stable pressure conditions.
- Install the device near the "MAG" diaphragm expansion tank.
  - You ensure pressure monitoring of the diaphragm expansion tank.
  - Set the "Magcontrol" operating mode at the device controller.



## Note!

- Ensure the integration with the "V" main flow volume. in particular in switching variants with hydraulic switching points and return admixtures.
  - For switching and make-up variants, see chapter 6.4 "Switching and make-up variants" on page 23 .

## 6.3.1.2 Make-up line



1	"ST" dirt trap
2	"BT" mains disconnect receptacle
3	"WC" make-up line

4	Device
5	"DC" degassing line (gas-rich water)
6	"DC" degassing line (degassed water)

For water make-up, note the following conditions:

- For a water make-up via a "BT" mains disconnect receptacle, its bottom edge must be at least 100 mm over the "PU" device pump.
- Close the connection of the "WC" make-up line when a make-up line is not connected.
  - Set the "Levelcontrol" make-up variant at the device controller.

**Note!**

Avoid a device fault.

- Ensure that manual water make-up to the facility system is possible.

**Note!**

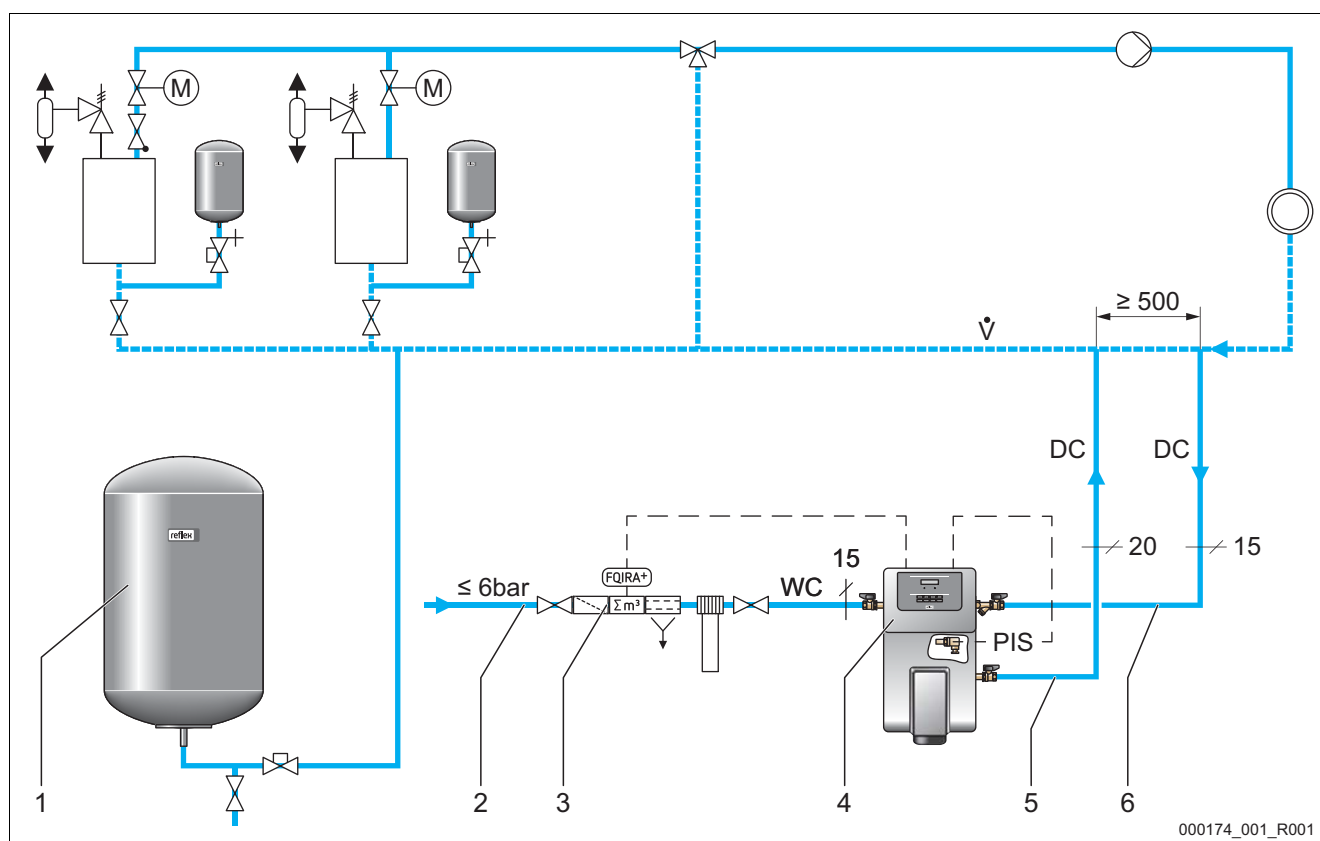
Use a pressure reducer in the "WC" make-up line if the idle pressure exceeds 6 bar.

## 6.4 Switching and make-up variants

Select the make-up variant in the Customer menu of the device controller, see chapter 7.4.3 "Parametrising the controller" on page 33 .  
Choose from one of the following make-up variants in the Customer menu:

- Pressure-dependent "Magcontrol" make-up.
  - In a facility system with diaphragm expansion tank.
- Level-dependent "Levelcontrol" make-up.
  - In a facility system with pressure maintaining station.

### 6.4.1 Pressure-dependent "Magcontrol" make-up mode



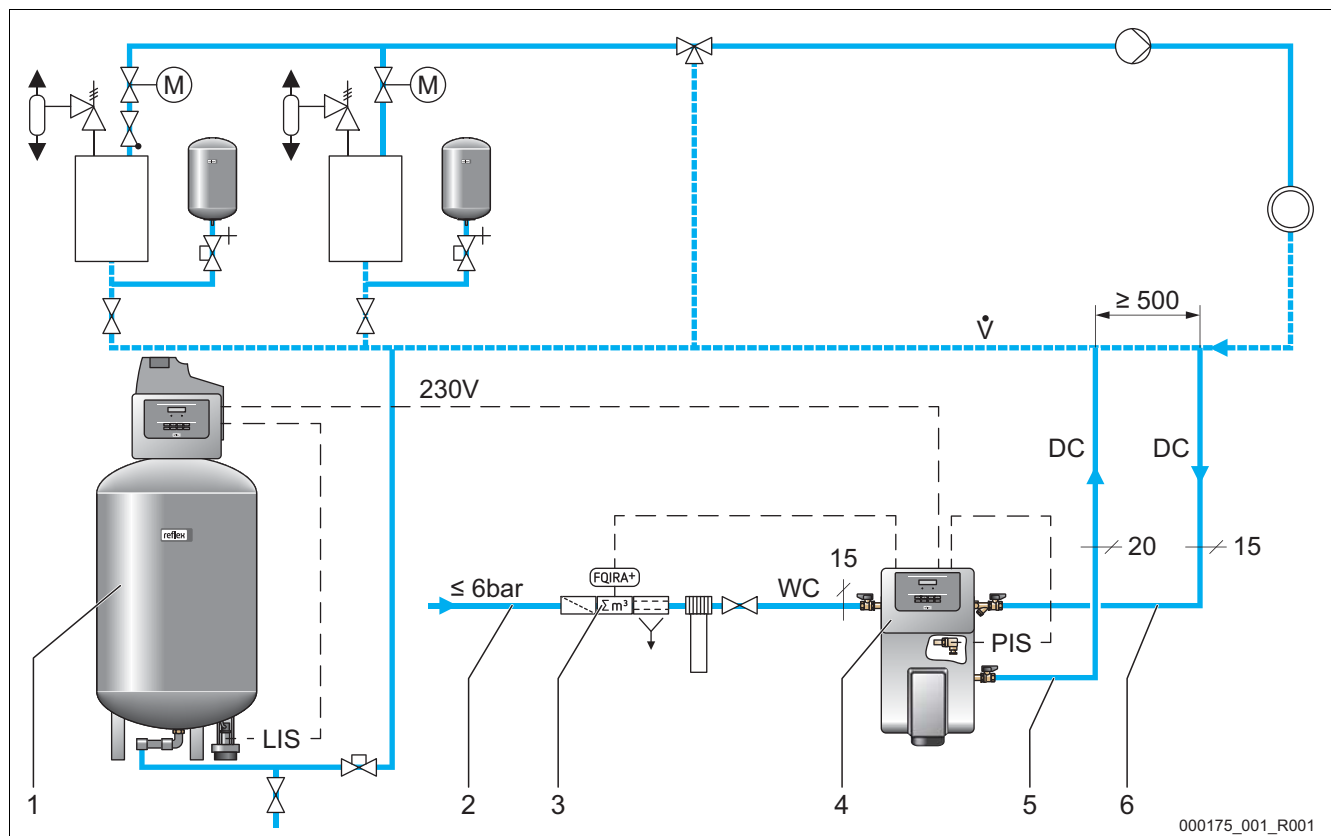
1	Diaphragm expansion tank
2	"WC" make-up line
3	For optional equipment and accessories, see chapter 4.6 "Optional equipment and accessories" on page 14
4	Device

5	"DC" degassing line (degassed water)
6	"DC" degassing line (gas-rich water)
PIS	Pressure transducer

The "Magcontrol" operating mode is set in the Customer menu of the device controller. This operating mode is used for facility systems with a diaphragm expansion tank. Water is added according to the pressure in the facility system. The required pressure sensor is integrated in the device. The degassing lines are installed near the diaphragm expansion tank to ensure pressure monitoring for the make-up with water.

### 6.4.2 Level dependent "Levelcontrol" make-up mode

The device is in "Levelcontrol" operating mode which is used for systems with pressure maintaining stations.



1	Pressure maintaining station
2	"WC" make-up line
3	For optional equipment and accessories, see chapter 4.6 "Optional equipment and accessories" on page 14

4	Device
5	"DC" degassing line (degassed water)
6	"DC" degassing line (gas-rich water)

The "Levelcontrol" operating mode is set in the Customer menu of the device controller. This operating mode is used for facilities with pressure maintaining stations and enables an elastic operation at constant pressure.

Water is added depending on the measured filling level in the expansion tank of the pressure maintaining station. The "LIS" pressure pick-up determines the filling level and sends this value to the controller of the pressure maintaining station. The controller sends a 230 V signal to the device controller when the filling level in the expansion tank has fallen below the set value. The device controller regulates the motor actuator of the 3-ways motor ball valve in the "WC" make-up line. This ensures a controlled make-up with water and monitoring of the make-up time and cycles.



## 6.5 Electrical connection



### Danger – electric shock!

- Risk of serious injury or death due to electric shock.
  - Ensure that the system is voltage-free before installing the device.
  - Ensure that the system is secured and cannot be reactivated by other persons.
  - Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.



### Danger – electric shock!

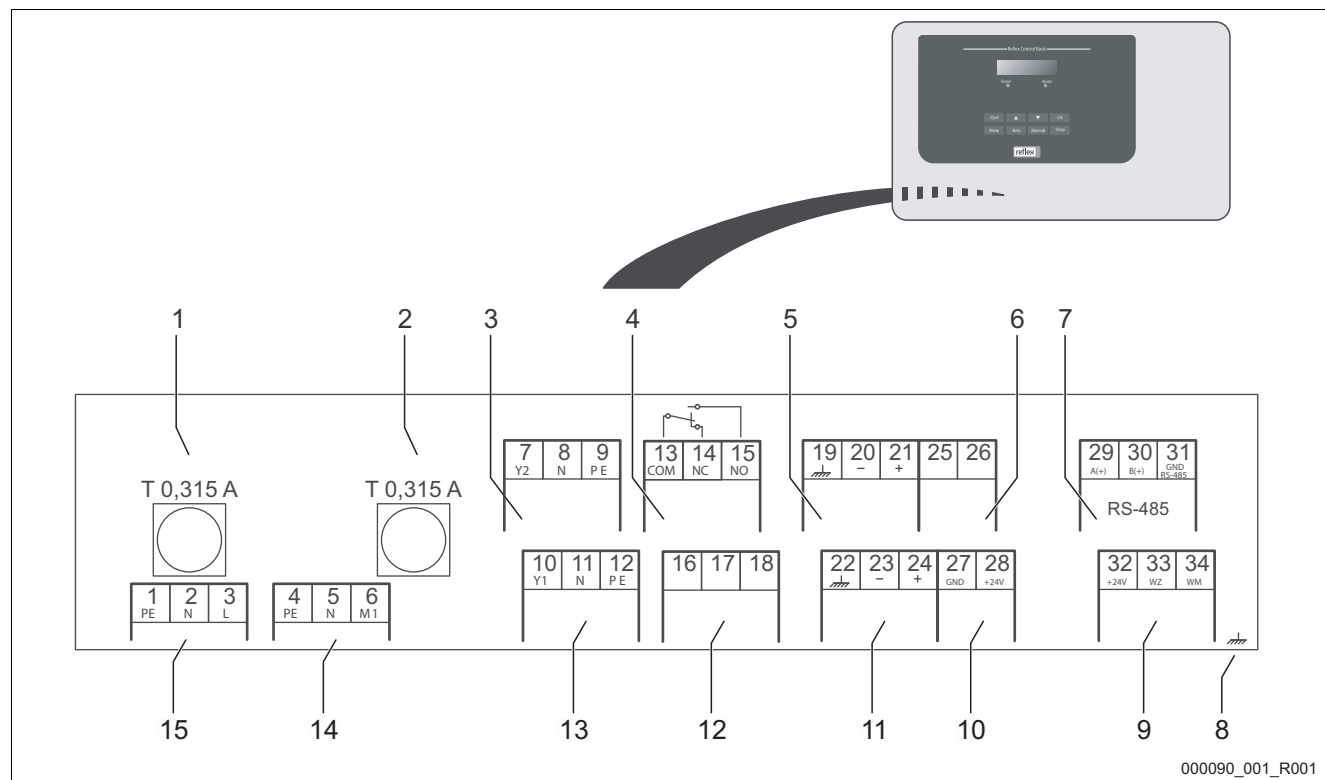
- Risk of serious injury or death due to electric shock. Some parts of the main board may still carry 230V voltage even with the device physically isolated from the 230 V power supply.
  - Before you remove the covers, completely isolate the device controller from the power supply.

The following descriptions apply to standard systems and are limited to the necessary user-provided connections.

1. Disconnect the system from the power source and secure it against unintentional reactivation.
2. Remove the cover.
3. Install a screwed cable gland suitable for the respective cable. M16 or M20, for example.
4. Thread all cables to be connected through the cable gland.
5. Connect all cables as shown in the terminal diagram, see chapter 6.5.1 "Terminal diagram" on page 26 .
  - Note that the fusing for the device connection is to be provided by the user, see chapter 5 "Technical data" on page 15 .
6. Install the cover.
7. Connect the mains plug to the 230 V power supply.
8. Activate the system.

The electrical connection is completed.

## 6.5.1 Terminal diagram



1	"L" fuse for electronics and solenoid valves
2	"N" fuse for solenoid valves
3	Overflow valve (not for motor ball valve)
4	Group message
5	Optional for second pressure value
6	"CD" 3-ways motor ball valve
7	RS 485 interface
8	Shielding

9	Digital inputs <ul style="list-style-type: none"> <li>• Water meter</li> <li>• Insufficient water</li> </ul>
10	"CD" 3-ways motor ball valve
11	Pressure analogue input
12	External make-up demand (Levelcontrol only)
13	Make-up valve
14	Pump
15	Mains supply

Terminal number	Signal	Function	Wiring
1	PE	230 V power supply via mains cable and plug.	Pre-wired
2	N		
3	L		
4	PE	"PU" vacuum pump for degassing.	Pre-wired
5N	N		
6 M1	M 1		
7	Y2	Overflow solenoid valve Not used in standard model	---
8	N		
9	PE		
10	Y 1	"CD" 3-ways motor ball valve for regulating the degassing of make-up and system water.	Pre-wired
11	N		
12	PE		
13	COM	Group message (floating).	User, optional
14	NC		
15	NO		
16	Not assigned	External make-up demand from a pressure maintaining station; controller must be set to "Levelcontrol"!	User, optional
17	Make-up (230 V)		
18	Make-up (230 V)		
19	PE shield	Level analogue input, not used by the device.	---
20	- Level (signal)		
21	+ Level (+ 18 V)		
22	PE (shield)	Pressure analogue input for display and make-up; controller must be set to "Magcontrol"!	Pre-wired
23	- Pressure (signal)		
24	+ Pressure (+ 18 V)		
25	0 – 10 V (correcting variable)	"CD" 3-ways motor ball valve, not used with the device.	---
26	0 – 10 V (feedback)		
27	GND		
28	+ 24 V (supply)		
29	A	RS-485 interface.	User, optional
30	B		
31	GND		
32	+ 24 V (supply) E1	Supply for E1 and E2.	Pre-wired, bridged
33	E1	Contact water meter, for example in Fillset, see chapter 4.6 "Optional equipment and accessories" on page 14 , for make-up evaluation, contact 32/33 closed = meter pulse.	User, optional
34	E2	Insufficient water switch, not used with the device, contact 32/34 closed = OK.	Pre-wired, bridged

## 6.5.2 RS-485 interface

Use this interface to retrieve all controller data and to enable the communication with control centres or other devices.

The following data can be requested:

- Pressure.
- Operating modes of the "PU" vacuum pump.
- Operating modes of the "CD" 3-ways motor ball valve for degassing.
- Cumulated quantity of the "FQIRA+" water meter.
- All messages, see chapter 8.2.4 "Messages" on page 41 .
- All entries in the fault memory.



### Notice!

If required, please contact the Reflex Customer Service for the protocol of the RS-485 interface, details of the connections and information about the accessories offered.

### 6.5.2.1 Connecting the RS-485 interface

Connect the interface as follows:

1. For connecting the interface use only a cable with these properties:
  - LJYCY (TP),  $4 \times 2 \times 0.8$ , maximum overall bus length 1000 m.
2. Use a shielded cable to connect the interface to terminals 29, 30, 31 of the main board in the control cabinet.
  - For connecting the interface, see chapter 6.5 "Electrical connection" on page 25 .
3. When using the device with a control centre not supporting an RS-485 interface (RS-232, for example), you must use a corresponding adapter.

## 7 Commissioning

### 7.1 Checking the requirements for commissioning

The device will be ready for commissioning when the tasks described in the "Installation" chapter have been completed.

- The device is stable.
- The connections of the device to the system has been created and the facility system pressure maintenance is operational.
  - One degassing line to the facility system.
  - One degassing line from the facility system.
- The connection of the device to the water make-up is made.
  - For automatic make-up with water.
- The connection lines of the device have been purged and cleaned of welding residue and dirt, if required, before commissioning.
- The facility system is filled with water and roughly gas-vented.
  - The circulation through the ensure facility system is ensured.
- The electrical connection has been created according to applicable national and local regulations.

### 7.2 Setting the minimum operating pressure for Magcontrol

The "P<sub>0</sub>" minimum operating pressure is required only for the make-up with pressure-dependent control in systems with a diaphragm expansion tank.

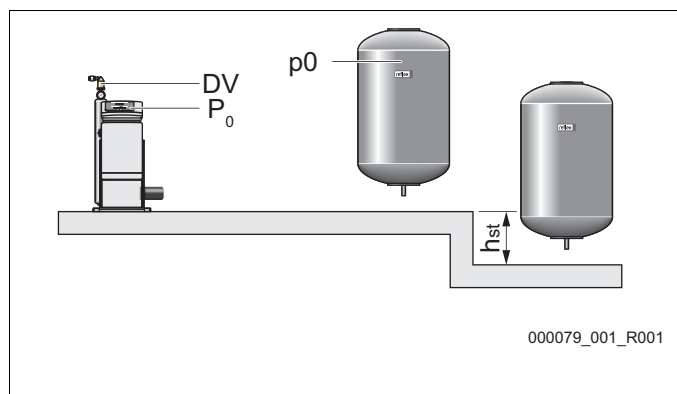
Proceed as follows:

1. Activate "Magcontrol" in the controller's Customer menu.
2. Determine the "P<sub>0</sub>" minimum operating pressure of the device relative to the "p<sub>0</sub>" initial pressure of the diaphragm expansion tank.

Calculate the minimum operating pressure as follows:

- The device is installed at the same level as the diaphragm expansion tank (h<sub>st</sub> = 0).
  - $P_0 = p_0^*$
- The device is installed at a lower level than the diaphragm expansion tank:
  - $P_0 = p_0 + h_{st}/10^*$
- The device is installed at a higher level than the diaphragm expansion tank:
  - $P_0 = p_0 - h_{st}/10^*$

\* p<sub>0</sub> in bar, h<sub>st</sub> in m



#### Note!

- Comply with the Reflex planning directive.
  - During planning, take into account that the working range of the device must be between the "p<sub>a</sub>" initial pressure and the "p<sub>e</sub>" final pressure in the working range of the pressure maintenance.

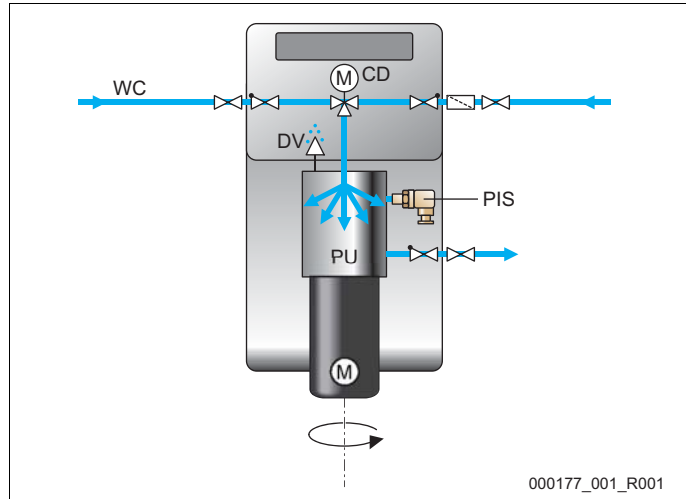
### 7.3 Filling the device with water

**Caution – Risk of injury due to pump start!**

- Hand injury due to a pump start.
  - De-energise the pump prior to turning the pump at the fan wheel with a screwdriver.

Use the system to fill water into the device.

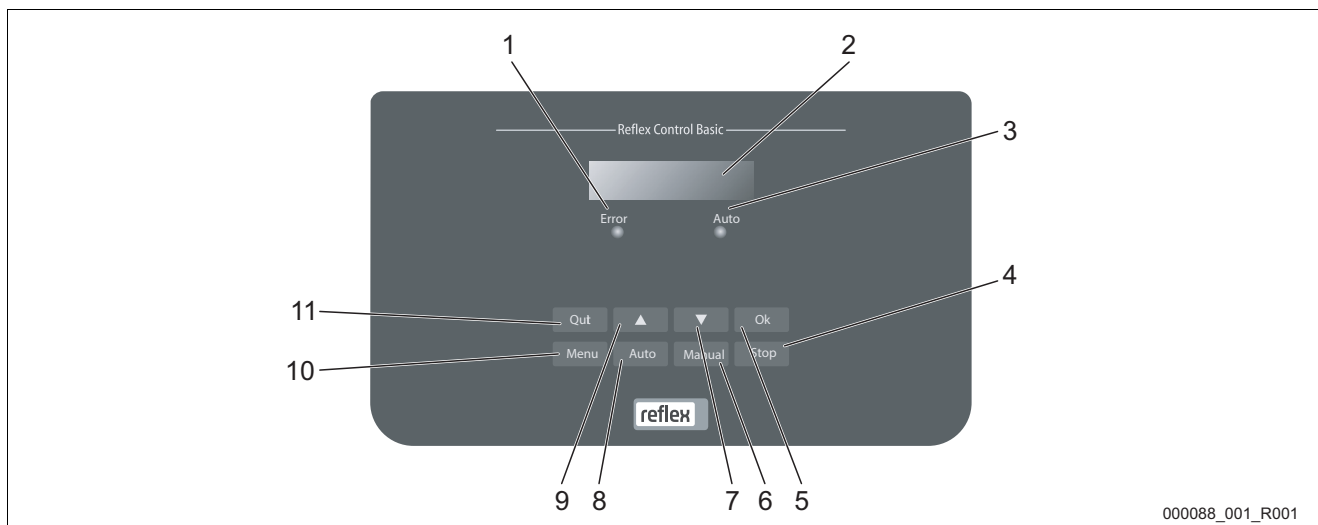
1. Open the "CD" 3-ways motor ball valve to the system.
2. Start turning the "PU" vacuum pump at the fan wheel using a screw driver.
  - Water flows in and air escapes from the vacuum pump via the "DV" degassing valve.



000177\_001\_R001

## 7.4 Controller

### 7.4.1 Operator panel



000088\_001\_R001

1	<b>Error LED</b> <ul style="list-style-type: none"> <li>The Error LED illuminates in the event of a fault</li> </ul>
2	<b>Display</b>
3	<b>Auto LED</b> <ul style="list-style-type: none"> <li>The Auto LED illuminates green in Automatic mode</li> <li>The Auto LED flashes green in Manual mode</li> <li>The Auto LED is not illuminated when the system is stopped</li> </ul>
4	<b>Stop</b> <ul style="list-style-type: none"> <li>For commissioning and entry of new values in the controller</li> </ul>
5	<b>OK</b> <ul style="list-style-type: none"> <li>Confirm actions</li> </ul>
6	<b>Manual</b> <ul style="list-style-type: none"> <li>For tests and maintenance tasks</li> </ul>

7	<b>"Back" to the previous menu</b>
8	<b>Auto</b> <ul style="list-style-type: none"> <li>For continuous operation</li> </ul>
9	<b>"Forward" to the next menu</b>
10	<b>Menu</b> <ul style="list-style-type: none"> <li>Call up the Customer menu</li> </ul>
11	<b>Quit</b> <ul style="list-style-type: none"> <li>Acknowledge messages</li> </ul>

#### Selecting and changing parameters

- Use "OK" (5) to select the parameter.
- Use the arrow buttons (7) or (9) to change the parameter value.
- Use "OK" (5) to confirm the parameter.
- Use the arrow buttons (7) or (9) to change the menu option.
- Use "Quit" (11) to switch to a different menu level.

## 7.4.2 Modifying the controller's start routine

The start routine enables the setting of the essential parameters required for the device's commissioning. It commences with the first activation of the controller and can be run only once. Parameters can be changed or checked in the customer after the start routine has terminated see chapter 7.4.3 "Parametrising the controller" on page 33 .



### Notice!

Plug in the contact plug to provide power (230 V) to the controller.

You are now in Stop mode. The "Auto" LED on the operator panel has extinguished.

### Magcontrol:

Select this setting if you want to realise a pressure-dependent automatic make-up in a system with diaphragm expansion tank.

### Levelcontrol:

Select this setting if you want to operate a level-dependent make-up in a system with pressure maintenance station.

Standard software with various languages.

Prior to commissioning, read the entire operating manual and verify the proper assembly.

Only displayed if "Magcontrol" has been selected in the "Servitec" menu option.

P0 calculation, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 29 .

Only displayed if "Magcontrol" has been selected in the "Servitec" menu option.

- Specify the tripping pressure of the applicable safety valve for the device protection. This is usually the safety valve at the system heat generator.

Change the flashing display items for "Hour", "Minute", and "Seconds" to the current time. The time of an alarm will be stored in the fault memory.

Change the flashing display items for "Day", "Month", and "Year" to the current date. The date of an alarm will be stored in the fault memory.

Select in the message line and confirm with "OK":

yes: The start routine is terminated. Servitec automatically switches to stop mode.

no: The start routine restarts.

The pressure is displayed only in "Magcontrol" mode.

Servitec  
Magcontrol

Language

Read the operating manual!

Min. op. pressure

Safety valve pressure

Time:

Date:

Terminate start routine?

2.0 bar  
STOP



### Notice!

You are in Stop mode. Please do not switch from the start routine to Automatic mode after entering the parameters.



### 7.4.3 Parametrising the controller

Use the Customer menu to display or correct system-specific values. In the course of commissioning, the factory settings must be adjusted for the system-specific conditions, see chapter 7.4.2 "Modifying the controller's start routine" on page 32 .



#### Notice!

Operation description, see chapter 7.4.1 "Operator panel" on page 31 .

All grey marked menu items must be reviewed during commissioning.

Press "Manual" to switch to manual operation.

Press "Menu" to display the first main menu option "Customer menu".

Switch to the next main menu option.

Customer menu

Standard software with various languages.

Language

Change the flashing display items for "Hour", "Minute", and "Seconds" to the current time.  
The time of an alarm will be stored in the fault memory.

Time:

Change the flashing display items for "Day", "Month", and "Year" to the current date.  
The date of an alarm will be stored in the fault memory.

Date:

Magcontrol:

Select this setting if you want to realise a pressure-dependent automatic make-up in system with diaphragm expansion tank.

Levelcontrol:

Select this setting if you want to realise a level-dependent make-up in system with pressure maintenance station.

Servitec 30:

Only displayed if "Magcontrol" has been selected in the "Servitec" menu option.

P0 calculation, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 29 .

Min. op. pressure

Only displayed if "Magcontrol" has been selected in the "Servitec" menu option.

- Specify the tripping pressure of the applicable safety valve for the device protection.  
This is usually the safety valve at the system heat generator.

Safety valve pressure

Switch to the "Degassing" sub-menu.

Degassing

Switch to the next list item.

Degassing

For a detailed description, see chapter 8.1.1 "Automatic mode" on page 37 .

Select from 3 degassing programmes:

- Continuous degassing
- Interval degassing
- Make-up degassing

Degas. programme

Time setting for Continuous degassing.

- For commissioning, we recommend to set the time for continuous degassing depending on the system volume and the glycol content, see chapter 5 "Technical data" on page 15 .

Time Continuous. degas.

Switch to the "Make-up" sub-menu.

Make-up

Switch to the next list item.

Make-up

Maximum time for a make-up cycle. Upon expiry of the set time, the system interrupts the make-up and returns the "Make-up time" fault message.

Max. make-up time

If the set number of make-up cycles is exceeded within 2 hours, the system interrupts the make-up and returns the "Make-up cycles" fault message.

Max. make-up cycles

This setting is relevant for the actuation of the "CD" 3-ways motor ball valve in make-up degassing.

Make-up pressure

> System pressure: Make-up pressure > system pressure

≤ System pressure: Make-up pressure ≤ system pressure

yes: FQIRA+ contact water meter is installed, see chapter 4.6 "Optional equipment and accessories" on page 14 .

This is the prerequisite for the make-up quantity monitoring and the operation of a softening system.

With water meter

no: A contact water meter is not installed (standard).

Only displayed if "YES" has been set in the "With water meter" menu option.

Make-up quantity

OK Delete meter:

yes: The displayed make-up quantity is set to 0.

no: The displayed water quantity is retained.

Only displayed if "YES" has been set in the "With water meter" menu option.

Max. make-up quantity

When the set quantity is exceeded, the system interrupts the make-up process and returns the error message "Max. make-up quantity exceeded".

Only displayed if "YES" has been set in the "With water meter" menu option.

With softening

yes: The system offers more queries regarding the softening process.

no: The system does not offer more queries regarding the softening process.

Only displayed if "YES" has been set in the "With softening" menu option.

Lock make-up?

yes: The system stops the make-up process when the set soft water capacity is exceeded.

no: The system does not stop the make-up process. The system displays the "Softening" message.

Only displayed if "YES" has been set in the "With softening" menu option.

Is calculated from the difference of the overall water hardness  $GH_{\text{actual}}$  and the target water hardness  $GH_{\text{target}}$  as defined by the manufacturer specification:

$$\text{Hardness reduction} = GH_{\text{actual}} - GH_{\text{target}} \text{ °dH}$$

Enter the value in the controller. Consult the manufacturer information for third-party products.

Hardness reduction

Only displayed if "YES" has been set in the "With softening" menu option.

The attainable soft water capacity is calculated from the type of softening used and the specified hardness reduction.

- Fillsoft I : Soft water capacity  $\leq 6000/\text{hardness red. I}$
- Fillsoft II : Soft water capacity  $\leq 12000/\text{hardness red. I}$

Enter the value in the controller. Consult the manufacturer information for third-party products.

Cap. soft water

Only displayed if "YES" has been set in the "With softening" menu option.

Available soft water capacity.

Remaining cap. soft w.

Only displayed if "YES" has been set in the "With softening" menu option.

Manufacturer specification for the replacement interval of the softening cartridges, regardless of the calculated soft water capacity. The system displays the "Softening" message.

Replacement in

Mandatory during commissioning and annual maintenance!

The system must be in manual mode!

Close all inlets to the "PU" vacuum pump.

yes: The system starts and automatically executes the test.

"Vacuum OK" is displayed if the test is successful.

"Vacuum Fault" is displayed if the test is failed.

Possible causes for the alarm:

- The vacuum pump is jammed. Start turning the pump at the fan wheel using a screw driver.
- "DV" degassing valve draws air. Install a new degassing valve.

Check and repair all potential causes and repeat the test.

After the test is successfully concluded, open the inlets to the pump.

no: The system does not execute a test.

Vacuum test

Recommended maintenance message.

Off: Without maintenance recommendation.

001 – 060: Maintenance recommendation in months.

Next maintenance

For the output of messages to the floating contact, see chapter 8.2.4 "Messages" on page 41.

yes: Output of all messages.

no: Output of all messages identified with "xxx" ("01", for example).

Floating fault contact

Switch to the fault memory or into the next main menu option.

Fault memory

The last 20 alarms are stored with fault type, date, time, and fault code.  
See the chapter "Messages" for more information about the ER... messages.

ER 01...xx

Switch to the parameter memory or into the next main menu option.

Parameter memory

The last 10 entries of the minimum working pressure are stored with date and time.

P0 = xx.x bar

Information about the software version.

Servitec 30

## 7.5 Starting Automatic mode

The automatic mode can be started as soon as the system is filled with water and the gases contained have been vented.

- At the controller, press "Auto" for automatic operation.
- During commissioning, continuous degassing is automatically activated to remove any residual free or dissolved gases from the system. This time can be set in the Customer menu as required by the system conditions. The default setting is 24 hours. Subsequent to the continuous degassing, the device automatically switches to interval degassing.



### Notice!

The commissioning process is now concluded.



### Notice!

The "ST" dirt trap in the "DC" degassing line must be cleaned after the expiry of the continuous degassing time at the latest, see chapter 9.2.1 "Cleaning the dirt trap" on page 45 .

## 8 Operation

### 8.1 Operating modes

#### 8.1.1 Automatic mode

Upon successful commissioning, you can activate the automatic mode with the degassing functions and, optionally, the automatic make-up. The device controller monitors the functions. Faults are displayed and evaluated.

For automatic mode, you can set three different degassing programmes in the Customer menu, see chapter 7.4.3 "Parametrising the controller" on page 33. Relevant information is displayed in the message line of the controller display.

##### Continuous degassing of the system water

Select this programme after commissioning and repairs of the connected system. The device will continuously degas for a set period of time. Free and dissolved gases are quickly removed. Upon request of make-up, make-up degassing is automatically activated for the set make-up time. In "Magcontrol" mode, the pressure is monitored and displayed.

Start/setting:

- Automatic start after execution of the start routine during commissioning.
- Activated from the Customer menu.
- Degassing time. Can be set in the Customer menu, dependent on the actual system. The default setting is 24 hours. After expiry of the set time, the device automatically switches to interval degassing.

Continuous degassing

##### Interval degassing of the system water

Designed for continuous operation. An interval comprises a number of degassing cycles, with the number to be set in the Service menu. An idling time follows an interval. The daily start of the interval degassing can be set to a specific time.

Start/setting:

- Automatic activation upon expiry of continuous degassing.
- Degassing cycles: 8 cycles per interval, to be set in the Service menu.
- Start time interval: To be set in the Service menu.
- Idling time between intervals: To be set in the Service menu.

Servitec  
Interval degassing

##### Degassing the make-up water

Is automatically activated for every make-up during continuous or interval degassing. The corresponding setting must have been made in the Customer menu.

The 3-ways motor ball valve switches the volume flow from system to make-up water. The process is the same as in continuous degassing. If the system water is not to be degassed or if the system is in Summer operation with circulating pumps shut down, you can activate the make-up degassing in the Customer menu.

Activation/setting:

- Automatic activation for every make-up.
- Activated from the Customer menu.
- Degassing time = Make-up time.

Servitec  
Make-up degassing

### 8.1.2 Manual mode

The manual mode is intended for test and service tasks.

Press "Manual" at the controller. The Auto LED at the operator panel flashes to visually indicate that manual mode is active. In manual mode, you manually switch the "PU" vacuum pump and the "CD" 3-ways motor ball valve. Both can be switched after each other and tested at the same time. The switching operation is blocked when safety-relevant parameters are exceeded (maximum pressure, for example). Use the arrow buttons at the operator panel to select the vacuum pump and the 3-ways motor ball valve.

- "Up" and "Down" buttons
  - Selects "PU" or "CD".
- "OK" button
  - Starts and shuts down "PU" or "CD".
- "Quit" button
  - Shuts down "PU" or "CD" in reverse sequence.
  - The last pressing switches you to Stop mode.
- "Auto" button
  - Return to Automatic mode.

		2.5 bar
PU !*	CD	
* "!" PU or CD is active		



#### Notice!

Manual operation can not be performed if safety-relevant parameters are exceeded.

### 8.1.3 Stop mode

The Stop mode is intended for the device commissioning.

Press "Stop" on the controller. The Auto LED at the operator panel extinguishes.

Except for the display of information, the device is non-functional in Stop mode. Function monitoring is stopped.

The "PU" vacuum pump is switched off. The system returns an alarm if the Stop mode is activated for more than 4 hours.

If "Floating alarm contact?" in the Customer menu is set to "Yes", the system outputs the alarm to the group alarm contact.

### 8.1.4 Summer operation

The degassing of the network water is not assured if the circulating pumps of the system are shut down during Summer because gas-rich water cannot reach the device. In order to save energy, use the Customer menu to set the degassing programme to make-up degassing. If the device is operated with make-up degassing during Summer, you must switch to interval or continuous degassing after the circulating pumps have been activated.

Setting in the Customer menu, see chapter 7.4.3 "Parametrising the controller" on page 33 .

#### Select from 3 degassing programmes.

- Continuous degassing
  - For commissioning and repairs.
- Interval degassing
  - For continuous operation (time-controlled).
- Make-up degassing
  - Only for make-up water. The machine is not degassed.

Degas. programme
Make-up degassing



#### Notice!

For a detailed description of the selection of degassing programmes, see chapter 8.1.1 "Automatic mode" on page 37 .

### 8.1.5 Restarting



#### Caution – Risk of injury due to pump start!

- Hand injury due to a pump start.
  - De-energise the pump prior to turning the pump at the fan wheel with a screwdriver.

After an extended standstill time (the device is de-energised or in stop mode), the "PU" vacuum pump may jam. For this reason, use a screwdriver to rotate the vacuum pump at the fan wheel of the pump motor before restarting.



#### Notice!

A jamming of the "PU" pump is prevented during operation thanks to forced starting action (after 24 hours).

## 8.2 Controller

### 8.2.1 Customer menu

see chapter 7.4.3 "Parametrising the controller" on page 33 .

### 8.2.2 Service menu

This menu is protected with a password. It can be accessed only by the Reflex Customer Service. A partial summary of the settings stored in the Service menu is provided in the Chapter Default settings, see chapter 8.2.3 "Default settings" on page 40 .

### 8.2.3 Default settings

The device controller is shipped with the following default settings. Use the Customer menu to adjust these values to local conditions. In specific cases, it is possible to further adjust the values in the Service menu.

#### Customer menu

Parameter	Setting	Remarks
Language	EN	Display language
Servitec	Magcontrol	For systems with diaphragm-type pressure expansion tank
Minimum operating pressure p0	1.0 bar	Only Magcontrol
Safety valve, pressure	3.0 bar	Pressure value for the safety valve of the heat generator in the system to trip
Next maintenance	12 months	Time left to the next due maintenance
Floating alarm contact	NO	Only the messages marked in the message list
<b>Make-up</b>		
Maximum make-up quantity	1000 Litres	Only if controller with "With water meter yes"
Maximum make-up time	20 minutes	Only Magcontrol
Maximum make-up cycles	3 cycles within 2 hours	Only Magcontrol
<b>Degassing</b>		
Degassing programme	Interval degassing	Continuous operation with degassing cycles
Continuous degassing time	5 hours	Time of continuous degassing
<b>Softening (Only if "With softening yes")</b>		
Lock make-up	No	Available soft ware capacity = 0
Hardness reduction	8°dH	= Target – Actual
Maximum make-up quantity	0 Litres	Attainable make-up quantity
Soft water capacity	0 Litres	Attainable water capacity
Cartridge replacement	18 months	Replace cartridge

#### Service menu

Parameter	Setting	Remarks
<b>Make-up</b>		
Pressure differential, "NSP" make-up	0.2 bar	Only Magcontrol
Pressure differential, filling pressure PF – P0	0.3 bar	Only Magcontrol
<b>Degassing</b>		
Idling times between degassing intervals	23 hours	Idling times between the degassing intervals
Number of degassing cycles for each interval	n = 8	Number of degassing cycles in one interval
Daily start	08:00 h	Start of the daily degassing intervals



## 8.2.4 Messages

The display provides alarms in plain text and the ER codes listed below. Use the arrow buttons to scroll through multiple alarms displayed at the same time.

The fault memory stores the last 20 alarms for review, see chapter 7.4.3 "Parametrising the controller" on page 33 .

Alarm causes can be eliminated by the operator or a specialist workshop. Please contact the Reflex customer service for alarms that cannot be repaired.



### Notice!

When the cause for the alarm is eliminated, you must acknowledge the fault with "Quit" at the controller's operator panel. All other alarms are automatically reset as soon as the cause has been eliminated.



### Notice!

Floating contacts, setting in the Customer menu, see chapter 7.4.3 "Parametrising the controller" on page 33 .

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
01	Minimum pressure	Yes	For "Magcontrol" setting only. <ul style="list-style-type: none"> <li>Set value not reached.</li> <li>Water loss in the system.</li> <li>Fault "PU" vacuum pump.</li> <li>Expansion tank defective.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check water level.</li> <li>Check vacuum pump.</li> <li>Check expansion tank.</li> </ul>	-
02.1	Insufficient water	-	<ul style="list-style-type: none"> <li>Insufficient pressure in the vacuum pump.</li> <li>Dirt trap clogged.</li> <li>"DC" degassing incoming line locked.</li> <li>"WC" make-up line locked.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Clean the dirt trap.</li> <li>Unlock the incoming lines.</li> </ul>	Quit
02.2	Insufficient water	-	Vacuum is not generated quickly enough. <ul style="list-style-type: none"> <li>"PU" vacuum pump defective.</li> <li>Gas in the vacuum pump.</li> <li>"DV" degassing valve leaking.</li> </ul>	<ul style="list-style-type: none"> <li>Check the vacuum pump and replace, if necessary.</li> <li>Replace the degassing valve.</li> </ul>	Quit
02.4	Insufficient water	-	Vacuum during make-up feed.	Open the make-up ball valve.	-
04.1	Pump	Yes	Vacuum pump disabled. <ul style="list-style-type: none"> <li>Pump jammed.</li> <li>Pump motor defective.</li> <li>Pump motor contactor (Klixon) tripped.</li> <li>Fuse defective.</li> </ul>	<ul style="list-style-type: none"> <li>Rotate the pump with screwdriver.</li> <li>Replace the pump motor.</li> <li>Electrically test the pump motor.</li> <li>Replace the 10 A fuse.</li> </ul>	Quit

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
06	Make-up time	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> <li>Water loss in the system</li> <li>Make-up line not connected.</li> <li>Make-up rate insufficient.</li> <li>Make-up hysteresis too low.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check water level.</li> <li>Connect "WC" make-up line.</li> </ul>	Quit
07	Make-up cycles	-	Set value exceeded.	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Seal the leak in the system.</li> </ul>	Quit
08	Pressure measurement	-	For "Magcontrol" setting only. <ul style="list-style-type: none"> <li>Controller receives incorrect signal.</li> </ul>	<ul style="list-style-type: none"> <li>Connect the plug.</li> <li>Check the cable for damage.</li> <li>Check the pressure transducer.</li> </ul>	Quit
10	Maximum pressure	-	For "Magcontrol" setting only. <ul style="list-style-type: none"> <li>Set value exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Set the tripping pressure of the safety valve.</li> </ul>	-
11	Back-up volume	-	"With water meter" must be activated in the Customer menu. <ul style="list-style-type: none"> <li>Set value exceeded.</li> <li>Severe water loss in the system.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check the water loss and correct, if necessary.</li> </ul>	Quit
14	Discharge period	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> <li>"DC" degassing line closed.</li> <li>Dirt trap clogged.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Open the "DC" degassing line.</li> <li>Clean the dirt trap.</li> </ul>	Quit
15	Back-up valve	-	Contact water meter measures without make-up request.	Check the "CD" 3-ways ball valve for leaks.	Quit
16	Power failure	-	No power.	Connect to power.	-

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
19	Stop > 4 hours	-	Device is in stop mode for more than 4 hours.	Set the controller to Automatic mode.	-
20	Maximum make-up quantity	-	Set value exceeded.	Reset the "Make-up quantity" meter in the Customer menu.	Quit
21	Maintenance recommended	-	Set value exceeded.	Carry out maintenance.	Quit
24	Softening	-	<ul style="list-style-type: none"> <li>Set value for soft water capacity exceeded.</li> <li>Time interval for replacement of the softening cartridge exceeded.</li> </ul>	Replace the softening cartridges.	Quit
30	I/O module fault	-	<ul style="list-style-type: none"> <li>I/O module defective.</li> <li>Connection between option card and controller faulty.</li> <li>Option card defective.</li> </ul>	<ul style="list-style-type: none"> <li>Replace the I/O module.</li> <li>Check the connection between option card and controller.</li> <li>Replace the option card.</li> </ul>	-
31	EEPROM defective	Yes	<ul style="list-style-type: none"> <li>EEPROM defective.</li> <li>Internal calculation error.</li> </ul>	Contact the Reflex Customer Service.	Quit
32	Undervoltage	Yes	Supply voltage not achieved.	Check power supply.	-
33	Adjustment parameter faulty	-	EPROM parameter memory defective.	Contact the Reflex Customer Service.	Quit
34	Main board communication faulty	-	<ul style="list-style-type: none"> <li>Connecting cable defective.</li> <li>Main board defective.</li> </ul>	Contact the Reflex Customer Service.	Quit
35	Digital input voltage faulty	-	Short-circuit of input voltage.	Check the wiring at the digital inputs (water meter, for example).	-
36	Analogue input voltage faulty	-	Short-circuit of input voltage.	Check the wiring at the analogue inputs (pressure/level).	-
37	No input voltage at the 3-ways motor ball valve	-	Short-circuit of input voltage.	Check the wiring at the 3-ways motor ball valve.	-

## 9 Maintenance



### Caution – risk of burning!

- Excessive surface temperatures in heating systems can cause skin to burn.
  - Wait until surfaces have cooled down or wear protective gloves.
  - The operator is required to attach corresponding warning notes in the device vicinity.



### Caution – risk of injury!

- If installation, removal or maintenance work is not carried out correctly, there is a risk of burns and other injuries at the connection points, if pressurised hot water or hot steam suddenly escapes.
  - Ensure proper installation, removal or maintenance work.
  - Ensure that the system is de-pressurised before performing installation, removal or maintenance work at the connection points.



### Caution – risk of injury!

- Bodily harm from a toppling device.
  - Ensure sufficient stability of the device.
  - Weigh down the bearing surface of the device's transport unit with suitable means.

Perform device maintenance at least once each year or after every deployment in a facility system.

The cleaning intervals depend on the operational conditions in the facility system.

Do not exceed the following recommended values:

- Continuous degassing time.
  - The continued degassing time depends on the "Va" system volume, see chapter 5 "Technical data" on page 15 .
- Interval degassing.
  - The setting values are stored in the Service menu.

The controller displays the annual maintenance due upon expiry of the set operating time.

- Use "Quit" to acknowledge the "Maintenance recommended" message.



### Note!

Maintenance work must be carried out and confirmed by specialist personnel or the Reflex Customer Service.

## 9.1 Maintenance schedule

The maintenance schedule is a summary of maintenance tasks to be carried out regularly.

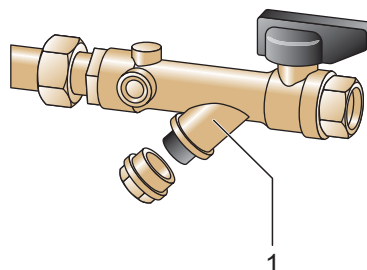
Maintenance task	Conditions			Interval
▲ = Check, ■ = Service, ● = Clean				
Check for leaks. • "PU" vacuum pump • Screw connections • "DV" degassing valve	▲	■		After every deployment in a facility system
Clean the dirt trap, see chapter 9.2.1 "Cleaning the dirt trap" on page 45 .	▲	■	●	After every deployment in a facility system
Check the controller settings.	▲			Prior to every deployment in a facility system
Function test, see chapter 8.1.2 "Manual mode" on page 38 . • "CD" 3-ways motor ball valve • "PU" vacuum pump	▲			After every deployment in a facility system
Check the tyre pressures of the transport unit	▲	■		Quarterly

## 9.2 Cleaning

### 9.2.1 Cleaning the dirt trap

The "ST" dirt trap in the "DC" degassing line must be cleaned after the expiry of the continuous degassing time at the latest. Check the dirt traps after every filling action or extended operation.

- Press "Stop" on the controller's operator panel.
  - The device is non-functioning and the "PU" vacuum pump is shut down.
- Close the ball valve upstream of the "ST" (1) dirt trap.
- Slowly unscrew the cap with the dirt trap insert at the dirt trap to release any residual pressure in the pipeline section.
- Pull the mesh from the cap and rinse it with clear water. Use a soft brush for cleaning.
- Re-insert the mesh into the cap, check the gasket for damage, and screw the cap back into the housing of the "ST" (1) dirt trap.
- Open the ball valve upstream of the "ST" (1) dirt trap.
- Press "Auto" on the controller's operator panel.
  - The device is switched on and the "PU" vacuum pump is in operation.



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#### Notice!

Clean all other installed dirt traps (in the Fillset, for example).

### 9.3 Maintenance certificate

All maintenance tasks have been completed according to the Reflex Installation, Operating and Maintenance Manual.

[illegible]

## 10

## Disassembly

**Danger – electric shock!**

- Risk of serious injury or death due to electric shock.
  - Ensure that the system is voltage-free before installing the device.
  - Ensure that the system is secured and cannot be reactivated by other persons.
  - Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.

**Danger – electric shock!**

- Risk of serious injury or death due to electric shock. Some parts of the main board may still carry 230V voltage even with the device physically isolated from the 230 V power supply.
  - Before you remove the covers, completely isolate the device controller from the power supply.

**Caution – risk of burning!**

- Risk of burning due to escaping medium.
  - Maintain a sufficient distance from the escaping medium.
  - Wear suitable personal protective equipment (safety gloves and goggles).

**Caution – risk of burning!**

- Excessive surface temperatures in heating systems can cause skin to burn.
  - Wait until surfaces have cooled down or wear protective gloves.
  - The operator is required to attach corresponding warning notes in the device vicinity.

**Caution – risk of injury!**

- Incorrect installation or service work may cause burns and other injuries at the connections when hot water or steam suddenly escape at pressure.
  - Ensure proper disassembly.
  - Ensure that the system is de-pressurised before performing the disassembly.

**Caution – risk of injury!**

- Bodily harm from a toppling device.
  - Ensure sufficient stability of the device.
  - Weigh down the bearing surface of the device's transport unit with suitable means.

**Caution – risk of injury!**

- The contact with glycol-containing water in facility systems for cooling circuits may cause skin and eye irritation.
  - Wear personal protective equipment.

Prior to the disassembly, lock out the "DC" degassing lines and the "WC" make-up line from the system and de-pressurise the device. Then disconnect the device from all electrical power sources.

Proceed as follows:

1. Set the device controller to manual mode, see chapter 8.1.2 "Manual mode" on page 38 .
2. Lock the connections from the device for the "DC" degassing lines.
3. Lock the connections from the device for the "WC" make-up line.
4. Disconnect the device from all electrical power sources.
5. Secure the facility system against unintended reactivation.
6. Disconnect the power cable of the device from the power supply.
7. Disconnect all cables leading from the facility system to the device controller.
8. Open the "CD" 3-ways motor ball valve in the device.
  - Wait until the pressure has equalised with the ambient temperature.
9. Remove the degassing lines from the device.
  - Ensure that the locking mechanisms at the device are not twisted when you remove the lines.
10. Remove the make-up line from the device.
  - Ensure that the locking mechanism at the device are not twisted when you remove the line.
11. Physically remove the device from the system.
12. Drain all residual water from the device.
  - At the device, open the connections for the degassing lines and the make-up.
13. Use a suitable container to catch the residual water.

The device is removed.



## **11            Annex**

### **11.1          Reflex Customer Service**

#### **Central customer service**

Switchboard: Telephone number: +49 (0)2382 7069 - 0

Customer Service extension: +49 (0)2382 7069 - 9505

Fax: +49 (0)2382 7069 - 523

E-mail: [service@reflex.de](mailto:service@reflex.de)

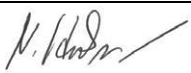
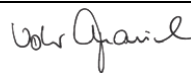
#### **Technical hotline**

For questions about our products

Telephone number: +49 (0)2382 7069-9546

Monday to Friday, 8:00 a.m. – 4:30 p.m.

## 11.2 Conformity and standards

Declaration of conformity for electrical installations in the pressure maintaining, make-up or degassing systems		
We hereby confirm that the products meets the essential protection requirements as established in the Council Directive to approximate the laws of the Member States relating to electromagnetic compatibility (2004/108/EC). The following Standards have been applied to assess the products:		Deutsches Institut für Normung, European Standard 61326 – 1:2006-10
We hereby confirm that the control cabinets meet the essential requirements of the Low-voltage Directive (2006/95/EC). The following Standards have been applied to assess the products:		Deutsches Institut für Normung, European Standard 61010 – 1:2002-08, Occupational Health and Safety Regulations of the trade associations (German BGV, Para 2)
<b>Manufacturer</b> <b>Reflex Winkelmann GmbH</b> Gersteinstraße 19 D - 59227 Ahlen - Germany Telephone: +49 (0)2382 7069-0 Fax: +49 (0)2382 7069-588 E-mail: info@reflex.de	The manufacturer declares that the pressure equipment (the assembly) complies with the requirements of Directive 97/23/EC.	
		
	Norbert Hülsmann	Volker Mauel
Members of the Board of Directors		

## 11.3 Guarantee

The respective statutory guarantee regulations apply.

## 11.4 Glossary

Hysteresis	Delayed behaviour of an output variable relative to the input variable. (The input signal influences the output signal)
Cavitation	Formation and dissolution of vapour-filled cavities (vapour bubbles) in fluids.
Cumulated	Cumulation of values.
Klixon	Pressure safety cut-out for the protection of the vacuum pump motor.
Permeation	Process in which a substance (permeate) penetrates or migrates through a solid body.





Thinking solutions.

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